T·Y·LIN INTERNATIONAL

May 6, 1997

Mr. Steve Heminger
Project Manager
Metropolitan Transportation Commission
101 Eight Street
Oakland, CA 94607-4700

Subject : Bay Bridge Design Task Force Workshop
Engineering and Design Advisory Panel (EDAP)

Dear Mr. Heminger:

First of all, our most sincere thanks for inviting us to submit a concept design for the new eastern span of the Bay Bridge, to be presented during the Design Task Force Workshop on May 12, 13 and 14, 1997.

Enclosed please find 50 (fifty) copies of our very preliminary concept design ideas presented in a few sketches and a brief description of the bridge types - we were only able to develop preliminary concepts since the time we received this request on May 2nd. Between now and the workshop we will prepare additional material for presentation.

Should you have any questions or need additional information, please do not hesitate to contact me at your convenience.

Sincerely yours,

T.Y. LIN INTERNATIONAL

Rafael Manzanarez, P.E.
Senior Principal

Encls.

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CONCEPT DESIGNS
FOR THE EAST SPAN REPLACEMENT OF THE
SAN FRANCISCO OAKLAND BAY BRIDGE
BY
T.Y. LIN INTERNATIONAL

We envision that the alignment for the new bridge will be located just north of the existing structure. The total length of the structure shall be approximately 14,000 ft. from the east portal of the Yerba Buena tunnel to the abutment on the Oakland side. The new structure shall accommodate five lanes of traffic and a standard shoulder in each direction. If needed, provision shall be made for a bicycle track.

The structure consists of a main span with a minimum navigational clearance of 500 feet and approach structures on each side.

MAIN SPAN TYPES

Self Anchored Suspension Bridge

The structure will have a single tower similar in proportion to the west span of the Bay Bridge. The bridge shall be self-anchored and hence does not require massive anchor blocks. The back span, towards the island, will be about 500 feet long. The main span 880 feet in length, will bridge the navigation channel. The tower will be located near the existing pier E2. It is envisioned that the back span will be built on falsework. The main span may be built with a combination of temporary cable stays and false-work towers.

The self-anchored suspension bridge provides a visual continuity with the existing west span of the San Francisco Bay Bridge. The motorist will have an impression of continuity across the entire bridge.

The fact that the bridge does not require any anchorage for the cables is a significant advantage, since the deep layer of bay mud makes any anchorage prohibitively expensive. The tower height is comparable to other bridge towers in the Bay Area and thus does not dwarf these other structures. The tower shape shown is one of the many possible shapes for a suspension bridge tower. We suggest a twin girder so that the bridge will be at least half open in case of serious traffic or other accidents. However, it is also possible to have a single deck of about 180 feet in width using two main cables.

The wide bridge deck and the torsionally stiff box girder is aerodynamically stable. For seismic reasons, a joint is placed between the main bridge and the approach spans because the soil condition is entirely different in these two sections of the bridge.

Dual-Pylon Cable-Stayed Bridge.

The cable stayed bridge will span 950 feet over the navigation channel. The dual reinforced concrete pylon, with a large base width, presents a more efficient structural form against lateral seismic forces. The anchor span will be a concrete box girder. It shall be built on

falsework. The main span cross-section shall be a steel box girder with orthotropic deck. The steel box girder shall be prefabricated and built in cantilever fashion.

Lightweight Concrete Segmental Box Girder Bridge

This is similar in concept to the Caltrans skyway bridge proposal. This appears to be the most economical solution for the required span over the navigation channel. The box girder shall have a gently curving parabolic soffit, with a depth of 10 meters at the pier and 4.5 meters at midspan.

The main advantage of this design is its low profile. This design shall not distract or shift focus from the aesthetics of the west span suspension bridge.

APPROACH STRUCTURE

Superstructure

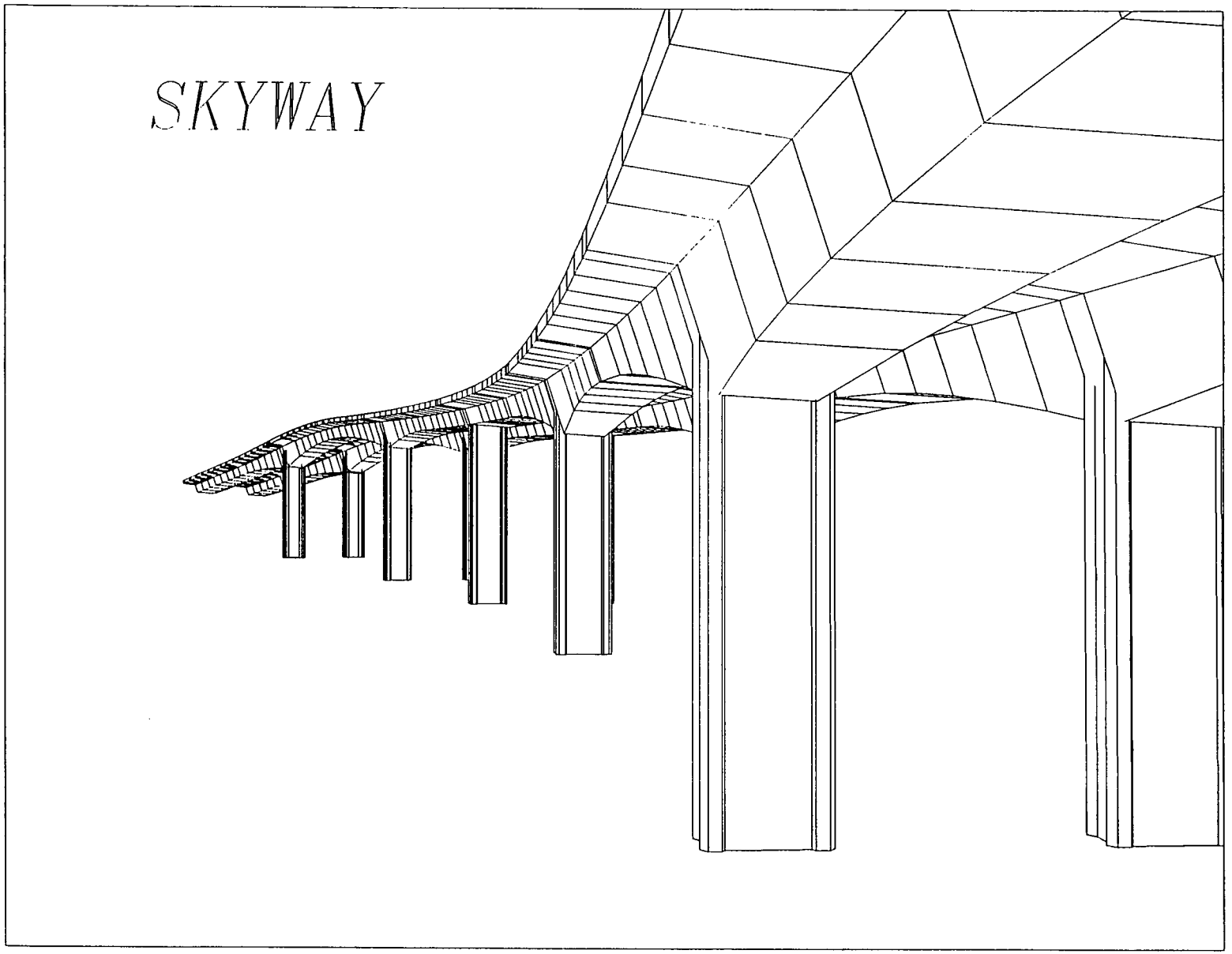
Approach structure will consist of two parallel single cell, light weight concrete, segmental box girders. A typical span length will be 550 feet. Each viaduct shall be about 84 feet wide. Lightweight concrete will be used in the superstructure which will reduce both the dead load and the seismic demands on the substructure. The superstructure shall be erected using balanced cantilever construction, thus avoiding any falsework over water.

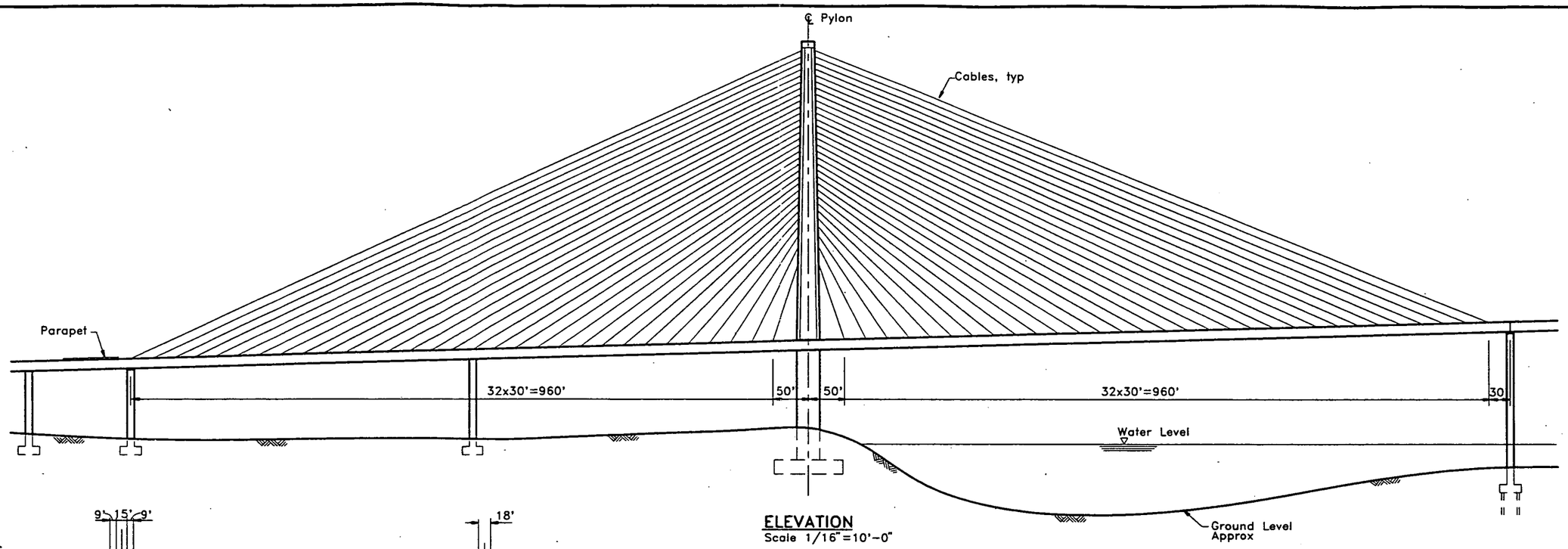
Piers

The piers shall be single cell reinforced concrete box type. Four circular columns heavily confined with spiral reinforcement and connected together with rectangular walls, define a new type of hybrid column which is well suited to seismically active environments. The piers shall be monolithic with the superstructure and foundation cap.

Foundation

It is envisioned that the foundation for this site will be multiple steel pipe piles of large diameter, in-filled with reinforced concrete. The pile will be monolithically connected to the foundation cap made of reinforced normal weight concrete. Offshore technology will be used for foundation construction and the large-diameter piles will be driven to the tip elevation required.


SKYWAY



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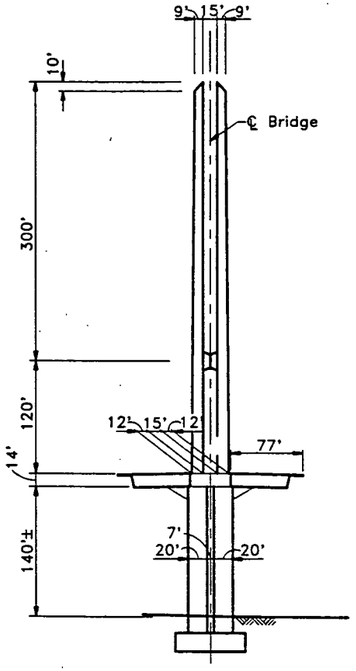

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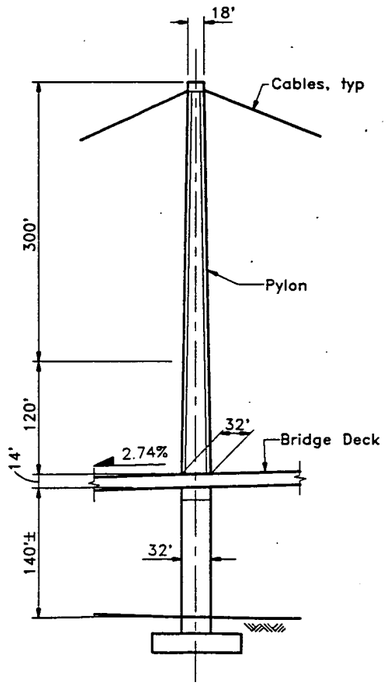

PYLON DETAIL 1
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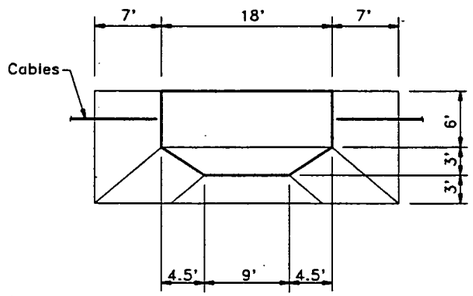

PYLON DETAIL 2
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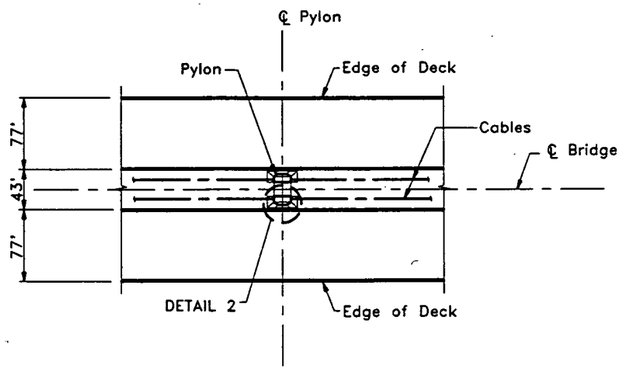


PARTIAL PLAN
Scale 1/16"=10'-0"

May 04, 1997 8:33:31 a.m.
Drawing: C:\BAY\BBRS-01.DWG
Xrefs: TYBORD.DWG

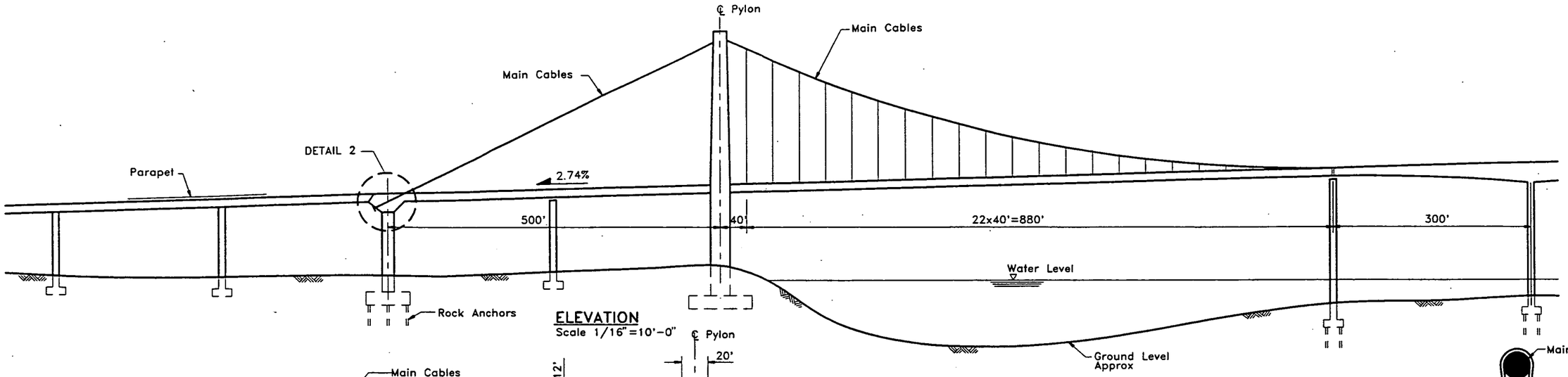
NO.	DATE	REVISION	APPROV.

NAME	DATE

T·Y·LIN INTERNATIONAL
825 BATTERY STREET
SAN FRANCISCO, CA. 94111

X
X

SHEET NO.
BBRS-1



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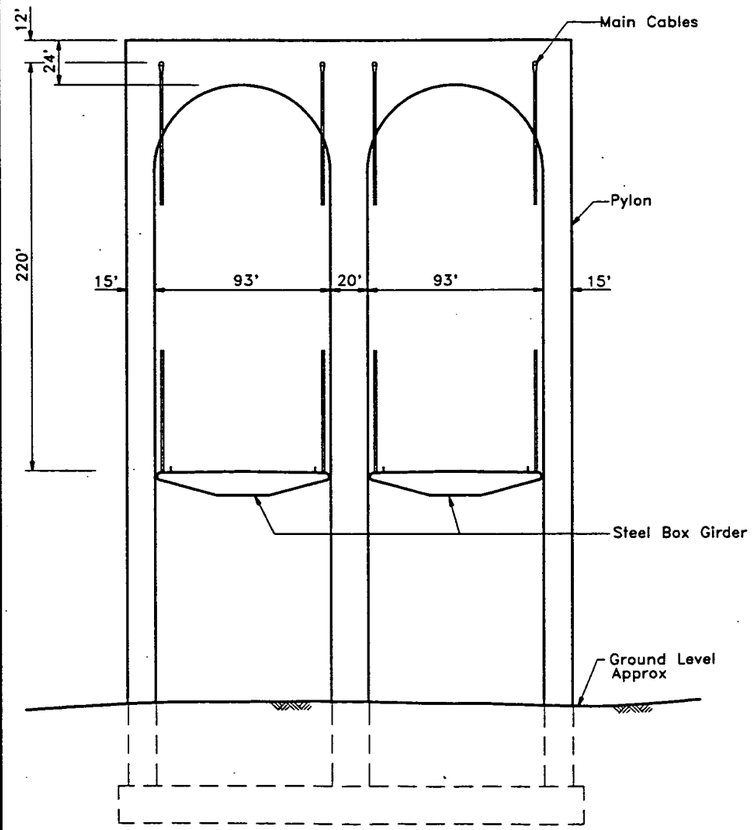

PYLON DETAIL 1
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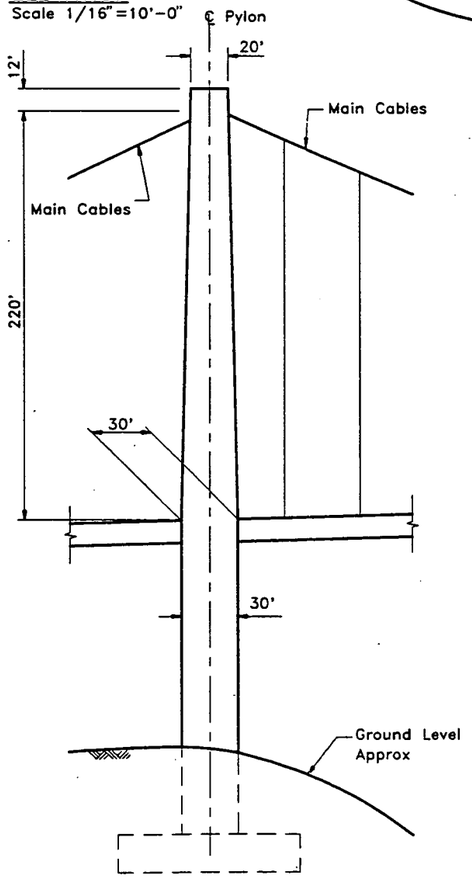

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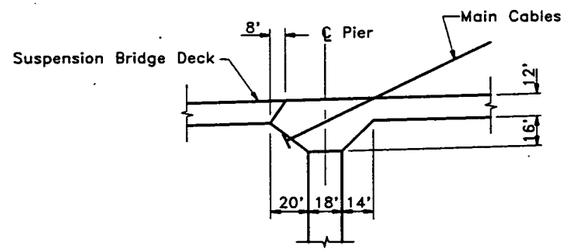

ANCHOR BLOCK DETAIL 2
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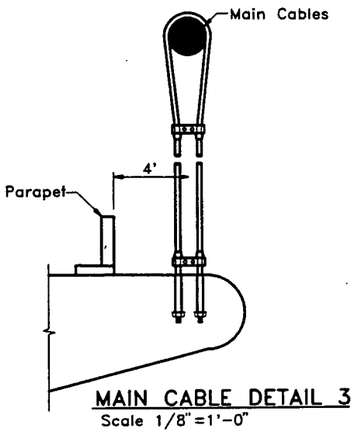

MAIN CABLE DETAIL 3
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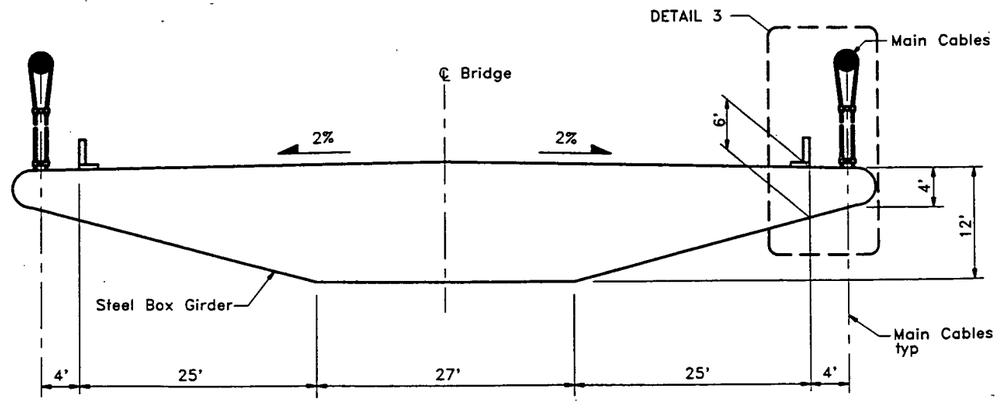

TYPICAL CROSS SECTION
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Xrefs: TYBORD.DWG

NO.	DATE	REVISION	APPROV.		NAME	DATE

T·Y·LIN INTERNATIONAL
825 BATTERY STREET
SAN FRANCISCO, CA. 94111

SELF-ANCHOR SUSPENSION BRIDGE

SHEET NO.
BBRS-3

Box 7, Folder 6

Item 8

ACCNO_000877